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THYSANOPTERA—NEW SPECIES AND NOTES.

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Family OROTHRIPIDAE Bagnall, 1926.

Erythrothrips arizonae Moulton, 1911.

This species was originally described from specimens taken on orange and olive blossoms at Phoenix, Arizona, and on *Rhamnus purshiana* at Oroville, California.

I have collected many new specimens during the past year and now record the new host plants and localities as follows: *Artemisia californica* (California sage), Willows, San Diego County; *Adenostoma fasciculatum*, Banning, Riverside County, and Mayfield, Santa Clara County; *Mentzelia laevicaulis*, Markleville, Alpine County; White Yarrow, Ebbett's Pass, Calaveras County, California, in May and June, and Mesquite, Phoenix, Arizona, in April.

The third antennal segment of Watson's *E. durango* is clear yellow with a dark cloud near apex and is "elongate wedge-shaped," also the maxillary palpus has seven segments and labial palpus three segments. The species *arizonae* shows a variation in the color of third antennal segment from basal half clear yellow and distal half shading to dark brown, or almost uniformly light brown, or light brown at base shading gradually to darker brown at apex. The sense area of third segment in holotype (female) is elongate (63 m. long), and is almost one-half as long as the segment itself (129 m.). In other specimens before me this sense area is elongate-ovate and only 15 m. long, which shape and size appear to be constant in many specimens.

The maxillary palpus in the holotype is uniformly deep brown in color and has eight distinct segments, while in other new examples before me the large basal segment of the maxillary palpus is deep brown and the distal segments, either six or seven, clear to almost transparent.

The dark longitudinal band along posterior margin of the fore wings may be continuous from the base of the wing including the scale, or the scale may be brown followed by a white area before the dark band, or the base of the wing including scale may be white and the darker band occupy only the three-quarters of the wing.

New material from Arizona before me shows the species as originally described. It may be that varietal differences can be established after a series of specimens have been compared.

Abnormal development of antennae: 6-segmented, with segments six to nine fused or with five to eight fused, or 7-segmented, with six to nine fused and divided into two equal segments.

Orothrips Moulton, 1911.

A large new series of specimens of this genus show clearly that *O. kelloggi* Moulton is a separate species from *yosemitei* Moulton, 1911. I am dividing the genus into two groups based on the shape and position of the sense areas and cones on antennal segments three and four, and am adding three new species.

GROUP I.

Orothrips kelloggi Moulton, 1907, is the largest of the members of the series before me and average specimens measure 2.1-2.4 mm. (original description gave the total body length as 1.80 mm.). Dark cross bands on the wings are distinct and the white areas are almost transparent except for the veins and spines. Third antennal segment usually brown, lighter in basal third or the tip of second and basal third of three may be yellowish. Fore tibiae are strongly colored on dorsal and ventral sides and yellowish or light brown throughout the middle. The sense areas on the third and fourth antennal segments are especially characteristic of this species; these, two in number on each segment, are long, narrow and extend from the tip to near the center of the segment. The new specimens, like the original types, were taken from the blossoms of Madrone and Manzanita in the Santa Cruz Mountains, California, in March and April. Adults appear only for a few weeks during the blossoming period. Larvae also are found within the blossoms and, like the adults, remain on the trees for only a short time. Both adults and larvae feed within the blossoms and do not seem to attack the foliage.

Orothrips keeni n. sp.

This species belongs in the *kelloggi* group which has the elongate sense areas on the third and fourth antennal segments.

Female holotype: Color: Very similar to *kelloggi*, almost uniformly dark brown with orange or reddish hypodermal pigmentation. Antennal segments one and two are deep brown like the body, three light brown in basal third, distal two-thirds of three and segments four to nine uniformly dark brown. Wing bands are less deeply colored than in *kelloggi* and their margins fade into the somewhat grayish lighter areas.

Female holotype: Total body length 1.6 mm.

Sense areas on antennal segments three and four elongate, those on segment three about one-quarter the length of the segment, those on four two-fifths the length of the segment. These sense areas with their long flattened sense plates are distinctly shorter than in *kelloggi*. The eighth antennal segment as in *kelloggi* is shorter than the ninth.

I take pleasure in naming this species after the collector, Mr. F. P. Keen, who found it on *Prunus emarginata* at Klamath Falls, Oregon, in May.

Holotype in author's collection (No. 902).

GROUP II.

Orothrips yosemitei Moulton, 1911.

Female: Color: Dark brown with reddish orange pigmentation. Third segment of antenna is yellowish white in basal half shading to dark brown in distal half. Fore tibiae shaded brown on dorsal and ventral sides and yellowish in the middle, especially in distal half; tarsi yellowish brown to brown. Wing bands are lighter and not so clearly defined as in *kelloggi*.

This species was originally described from specimens taken by the writer in flowers of *Ceanothus* sp. in the Yosemite Valley, California. A new series of specimens have been taken from the flowers of a *Ceanothus* in the hills near Redwood City, California. These specimens show that the oval sense areas of antennal segments three and four with their broad, short sense plates are constant and that the species is clearly distinct from *kelloggi*. The two sense areas of segment three, as is also the smaller one on segment four, are almost equal in size (12 mm. long by 8 mm. wide), while the larger one on segment four is nearly twice as long (21 mm. long by 9 mm. wide). Total body length 1.66 mm.

Orothrips raoi n. sp.

Female holotype, color: Uniformly deep brown except second antennal segment which is lighter at the tip; third segment yellowish white in basal half, outer half dark brown. Fore tibiae yellowish in the middle, fore tarsi yellowish brown. Total body length 1.58 mm.

Very similar to *yosemitei* and yet I cannot assign it to that species. I take pleasure in naming it after the collector, Mr. K. Ananthawamy Rao, who gathered the specimens in Bangalore, India.

Host plant not known.

Holotype in author's collection (No. 1226).

Orothrips variabilis n. sp.

Female holotype, color: Similar to *O. yosemitei* except that the dark bands on the distal part of the fore wings have faded to light gray and are generally diffused into the lighter areas adjoining, while the dark bands in the middle of the wings are distinct but lighter than in *yosemitei*. Third antennal segment is grayish-white in basal half shading to brown in distal portions.

Smaller than *O. yosemitei*. Total body length 1.33 mm. as compared with 1.66 mm. in *yosemitei*, and with antennal segments, especially three, four and five much shorter.

Sense areas on antennal segments three and four are oval as in *yosemitei*.

Specimens collected from cherry blossoms in May, at Vacaville, California.

All types in author's collection.

Comparative Measurements
Antennal segments in microns

Group I.									Total body length
	2	3	4	5	6	7	8	9	
♀ <i>O. kelloggi</i> M. . . .		123	111	63	45	39	27	33	2.1-2.6 mm.
♀ <i>O. keeni</i> M.	45	84	79	51	42	36	21	30	1.6 mm.
Group II.									
♀ <i>O. yosemitei</i> M. . .	45	96-111	81	60	45	39-42	27	30	1.6-1.9 mm.
♀ <i>O. raoi</i> M.	51	105	84	57	45				1.58 mm.
♀ <i>O. variabilis</i> M. . .	45	84	69	51	42	33	27	27	1.5 mm.

Family AEOLOTHRIPIDAE Haliday

Aeolothrips fulvicollis Bagnall, 1919

Specimens of this thrips collected from blossoms in Kaunli garden, Dehra Dun, India, were sent to me through the courtesy

of Mr. J. C. M. Gardner, Systematic Entomologist of the Forest Research Institute, Dehra Dun. (No. 639).

Aeolothrips nasturtii Jones, 1912

I have taken another good specimen from peach foliage at San Jose, California, where the type specimen was found, which should be referred to Jones' species with the following notations: four cross veins or fore wings present but indistinct; longitudinal veins set regularly with spines, those within white areas transparent and difficult to see. Sense area on distal part of third antennal segment elongate and about one-quarter the length of the segment; sense area on segment four elongate and about three-fifths the segment's length; white area on segment five is round and bears a long narrow sense cone.

Aeolothrips hartleyi n. sp.

Female holotype, with the characters of the genus.

Color, uniformly dark brown with bright red pigmentation.

All legs uniformly dark brown. Antennal segments one and two dark brown, three yellowish white, brown at extreme tip, four dark brown gradually shading lighter toward the base, other segments dark brown. Fore wings white at base with a complete dark cross band in second quarter which continues in second fifth as a dark longitudinal band along posterior margin reaching to near tip; hind wings entirely transparent. Total body length 1.33 mm.; female paratype 1.9 mm.

Male allotype: Total body length 1.33 mm. Similar in color to female, also with bright red pigmentation. Clasping organs on the side of the ninth abdominal segment quite similar to those in *fasciatus*.

This species is closely related to *Aeolothrips crassus* Hood and *vittatus* Hal., but separated from both by the dark fourth segment. Antennal segments three and four are light yellowish white in *crassus* and smoky white in *vittatus*. Segment three is four times as long as wide, while in *crassus* it is three times as long as wide; segments four and five are subequal and one-third shorter than three, *crassus* has three and four subequal, *vittatus* has four shorter than three and five shorter than four.

The sense area near the tip of antennal segment three is elongate ovate (6 x 15 m.), of four elongate with rounded ends (8 x 27 m.), with distal two-fifths bent to one side, of five almost round; in the male the sense areas on three are similar to those of the female but slightly smaller, on four broadly ovate (9 x 15 m.), and on five ovate.

Measurements of antennal segments

	1	2	3	4	5	6	7	8	9	Total
♀ Holotype	30 m.	54	108(27)	75	75	15	15	15	12	375 m.
♂ Allotype	30 m.	54	105(27)	75	75	15	15	15	12	375 m.
♀ Paratype	24 m.	45	90(24)	75	72	18	12	12	9	360 m.

Mr. E. A. Hartley gathered these specimens on *Populus tremuloides* in June at Cranberry Lake, N. Y., and I take pleasure in naming the species after him.

Described from two females and one male.

All types in author's collection.

***Aeolothrips duvali* n. sp.**

With the characters of the genus.

Female holotype: General color dark brown to blackish brown including all legs and antennae with the exception of the third segment which shades gradually to lighter brown in basal half. Bright red hypodermal pigmentation throughout thorax and abdomen. Fore wings each with two dark cross bands as in *fasciatus*. Some specimens have the intermediate abdominal segments brown to light brown with reddish orange colored pigmentation; segments nine and ten however are constantly dark brown. Total body length 1.75 mm. Antenna length: segment II, 54 m.; III, 102; IV, 90; V, 66; VI, VII, VIII, and IX, 72; total 384 m.

Sense areas on antennal segments three and four elongate and occupy half the length of the segments, whitened area on five ovate.

Male allotype: Colored as the female except segment two which is lighter brown toward the tip and three which is light brown at the base, gradually shading darker toward the tip. Claspers on ninth abdominal segment similar to those in *fasciatus*. Sense cones on antennal segments similar to those of female. Total body length 1.06 mm. Antenna length: segment II, 45 m.; III, 84; IV, 66; V, 60; VI, VII, VIII, and IX, 60; total 315 m.

This species may be separated from *fasciatus* by the darker third antennal segment and by the absence of triangular plates on fourth and fifth tergites in the male.

Described from fifteen female and four males.

Mr. H. H. Duval collected these specimens at Bastrop, Texas, from the following host plants: *Draba cuneifolia*, *Bellis integrifolia*, *Oenothera grandiflora* and *Hartmannia speciosa*. From the variety of host plants it would seem to be a rather common species in this locality.

I take pleasure in naming the species after the collector.

All types in author's collection. (No. 746)

Aeolothrips tuolumnei n. sp.

With the characters of the genus.

Female holotype: General color dark blackish brown including all legs and antennae except tip of segment two which is light brown, three which is light yellowish brown slightly shaded at the extreme tip and four which is brown in basal third and shading gradually to dark brown; other segments dark brown. Fore wings with two cross bands as in *fasciatus*. Total body length 1.50 mm. Antenna length (width) segment I, 18 m.; II, 45; III, 105 (24); IV, 90; V, 60; VI, 36; VII, 21; VIII, 15; IX, 9 m.

Very close to *fasciatus* but separated by the following characters: Last four segments of antennae decreasing in length gradually with six more than twice as long as eight and four times as long as nine, and 6-9 together about one and one-third times as long as five (in *fasciatus* last four segments are almost subequal and together about as long as five); third antennal segment light colored throughout except a slight shading at extreme tip, basal third of four lighter (in *fasciatus* segment three is darker in distal half); transparent area on segment three relatively shorter than in *fasciatus*, area on segment four broadly cone-shaped and occupying about one-fourth the length of the segment.

Two specimens before me are considerably smaller and are light brown but with the two terminal abdominal segments dark brown, with total body length 1.16 mm.

Described from eleven females. Male not known.

Collected by sweeping grass and wild flowers at Tuolumne Meadows, Tuolumne County, California, at an elevation of 9000 to 9500 feet, and named after the type locality.

All types in author's collection (no. 939).

Family FRANKLINOTHRIPIDAE Bagnall, 1926

Franklinothrips vespiiformis Crawford has been taken from the foliage of citrus trees at Calexico, Southern California, which extends the distribution of the species. Specimens collected by Mr. E. A. McGregor in October.

Family THRIPIDAE Uzel, 1895

Subfamily SERICOTHRIPINAE

Genus **Kurtomathrips** nov.

Vertex of head with a deep emargination forming two lobes comparable with *Prosopothrips*. Eyes prominent, protruding.

Antenna with segment two large and globular, three smallest of intermediate segments. Mouth cone long, pointed. Head with prominent semi-reticulate high lines. Bristles of head and thorax thick and curved. Wings wanting. Bristles on abdominal segments one to eight curved, on nine and ten straight.

Type of genus *Kurtomathrips morrilli*.

***Kurtomathrips morrilli* n. sp.** (Fig. 1.)

Female holotype, color: Uniformly light brownish yellow, segments one to five of antenna yellow except basal half of three (not including pedicel) which is light brownish-gray; segments six to eight dark brown; a brown spot on either side of posterior part of prothorax, on either side of meso- and metathorax and abdominal segments one to eight.

Total body length .66 mm. Head length .066 mm., width across eyes .087 mm., across at cheeks .075 mm.; prothorax length .105 mm., width at anterior end .075 mm., across posterior end .150 mm. Antenna length (width) segment I, 9 m. (18 m.); II, 27 (24); III, 21 (15); IV, 24 (18); V, 30 (18); VI, 33 (15); VII, 9; VIII, 9; total .165 m.

Head (excluding prominent eyes) about as wide as long, vertex deeply emarginate forming two prominent lobes with two distinct though transparent warts on either side, each bearing a strong, transparent curved spine; the inner warts are placed at the tips of the prominent lobes and the outer pair halfway between the lobes and the inner margins of the eyes. Cheeks almost parallel, rough, and with a prominent transparent spine-bearing wart just behind each eye. Eyes prominent, protruding, with coarse facets, not pilose, and occupying more than half the length of the head. Ocelli wanting. Mouth cone long, narrow, pointed, and reaching anterior margin of mesothorax. Maxillary palpi with three and labial palpi with two segments. Antennae more than twice as long as head. First segment is short and broad, two is broadest, subglobular, three is short and smallest of intermediate segments with distinct pedicel, four and five sub-clavate, five is distinctly longer than four, six sub-ovate. Segment seven only a very little longer than eight. Spines and sense cones transparent and very difficult to determine.

Prothorax about one-third longer than head, with sides expanding gradually to near base where they are abruptly constricted, forming the prominent posterior angles. Each posterior angle bears two stout, curved, transparent spines, the inner one being shorter and difficult to observe. The meso- and metathorax each with two curved spines on either side. Legs unarmed. Wings wanting.

Abdomen elongate, ovate. Segments one to eight each with two curved spines on either side, one in the middle and one at each posterior angle; bristles on the eighth segment are almost straight, those on the ninth and tenth segments straight. Posterior margin of the metathorax, also of abdominal segment one to eight, serrate.

Described from twelve specimens.

All types in author's collection. (No. 896).

Locality and host plant: Gila Bend, Arizona, on cotton.

I take pleasure in naming this species after the collector, Dr. A. W. Morrill, who has made the following observations:

"The specimens were all collected from cotton plants and I did not find it on any other food plant. I was unable to find any specimens with wings and believe that there were no winged forms present. The individuals which I took to be the adults were wingless. They were very light brown in color with a series of medium brown spots along each side of the body, one to a segment. The nymphs were numerous and considerable damage had been done to about one per cent. of the plants, all of which were more or less stunted and suffering from lack of water. Badly infested and damaged plants were frequently standing beside plants which were apparently free from insects. In fact it was general that injured plants were scattered and the majority of the plants were entirely free from the insects as far as I could determine. All stages fed on both surfaces of the leaves although the under surfaces were slightly preferred to the upper surfaces. It may be that an examination at different times during the day would show that the insects preferred the lower surfaces during the heated portion of the day, when all of my observations were made."

Dr. Morrill adds further: "Further observations made on September 27th and 30th, 1926, each note referring to the condition in a quarter section of 160 acres.

1. 'One area 50 feet diam. has 25% of plants with browned leaves due to thrips mentioned last report. Most of these plants show dwarfing of bolls.'
2. 'Thrips all gone and new growth of 6-8" on injured plants entirely free from this injury.'
3. 'Thrips injury noticeable on account of stunting (water shortage), 10-15% of plants injured 10%.'
4. 'Thrips work noticeable 15-25% of plants.'

At the time of my September examination I found only a very few specimens of thrips present on the plants and no winged specimens."

Taeniothrips tahoei n. sp. (Fig. 2.)

Male holotype: Color, dark brown, segments two, three and four of abdomen lighter, other abdominal segments shading gradually to darker brown at tip. Legs dark brown, fore tibiae yellowish, shaded on upper and lower sides, middle tibiae yellowish at both ends, hind tibiae yellowish at base, all tarsi yellowish. Antenna dark brown except tip of segment two which is yellowish brown and three which is yellowish brown shaded with light brown or gray in distal third. Wings brown, shading lighter toward base and darker toward tip. Total body length 1.50 mm. Head length .166 mm., width .19 mm.; prothorax length .15 mm., with .25 mm. Antenna length, segment I, 30 m.; II, 44; III, 87; IV, 72; V, 51; VI, 69; VII, 12; VIII, 15; total 375 m.

Head semi-angular in front, eyes protruding, a deep constriction at posterior margin of eyes which causes them to stand out conspicuously. Cheeks slightly arched, with sides diverging posteriorly. Back of head with numerous cross wrinkles. A pair of very long (67 m.) strong, straight interocellar bristles situated between posterior ocelli; a shorter pair on vertex opposite and a little in front of anterior ocellus and close to inner margins of eyes. A series of dorsal lateral spines posterior to eyes. Eyes prominent, facets coarse, pilose. Ocelli large. Antenna long and slender, two and one-thirds times as long as head, segment three longest, basal third unique in shape, enlarging gradually from a rather stout pedicel to about one-quarter the segment's length where there is a broad slight but noticeable constriction, beyond which the segment is again normal. Slender forked trichomes on segments three and four.

Prothorax slightly shorter than head. A conspicuous forward directed spine on each anterior angle (36 m.); spines on posterior angles long and stout, outer 78-81 m., inner 81-90 m., dorsal-lateral spines slightly longer than those on anterior angles, postero-marginal spines weak except innermost pair. Anterior legs stronger, middle and hind legs slender. Wings fully developed, strong; fore veins with eight (3-5) spines on basal portion, and three (1-2) in distal half, hind vein with 10-14 spines. Abdomen large, as wide as pterothorax, broadly round at tip. Small oval im-

pression on sternites 2-6, 27 x 60 m. on segment four. Comb along posterior margin of segment eight fully developed. Spines on segments nine and ten especially long, 165-171 microns.

Described from one specimen taken from grass at Lake Tahoe, California, in July. This species should be placed in the group with *picipes*, Zett.

Holotype in author's collection. (No. 956).

Taeniothrips pingreei n. sp. (Fig. 3.)

Male holotype: Color: Uniformly dark brown, except tips of segment two and basal half of segment three of antenna which are lighter brown, median portion of fore tibia, extreme base of middle and hind tibia and all tarsi which are lighter brown. Wings gray brown, only a little lighter near base.

Total body length 1.38 mm.; head length .141 mm., width .15 mm.; prothorax length .12 mm., width .183 mm.; pterothorax width .282 mm. Antennae length: segment I, 30 m.; II, 39; III, 66; IV, 60; V, 45; VI, 63; VII, 9; VIII, 12; total length 330 microns.

Head shaped very similar to foregoing species (*tahoei*), but the constriction behind the eyes is less conspicuous, interocellar spines are placed between the posterior ocelli, are shorter (60 m.) and weaker than in the foregoing species; and row of spines behind eyes are also less conspicuous. Eyes are large and prominent; ocelli fully developed. Antenna shorter, about twice as long as head, and segments three to six more compact than in *tahoei*.

Prothorax as in *tahoei* but all spines are weaker and shorter (60 m.). All legs slender; fore pair not so clearly enlarged as in *tahoei*. Wings strong. Fore wings with spines grouped as follows: Holotype, right wing, costa 21, fore vein 7 (3-4) and 3 (1-2); hind vein 10. In male paratypes the grouping at base of fore vein varies, but is constant 3 (1-2) in outer half.

Abdomen with oval impressions on sternites 3-7 much smaller than in *tahoei*, 15 x 39 m. on third segment; tip bluntly rounded. Fully developed comb on posterior margin of segment eight, longest spines on segment nine and ten about 135 m.

Female allotype, color: Uniform deep brown with fore tibiae and all tarsi only slightly lighter; third antennal segment lighter in basal half. Fore wings brown with small oval transparent area near base of wing between and just

below intermission in spines on fore vein. Posterior wings light brown with a dark brown median line extending from base to near tip.

Total body length 1.50 mm.; antennae length: segment I, 30 m.; II, 46; III, 84; IV, 75; V, 48; VI, 69; VII, 9; VIII, 12.

General appearance as in male. Interocular spines placed between posterior ocelli (60 m.); inner spines on posterior angle of prothorax 90 m., outer ones a little shorter. Fully developed comb along posterior margin of eighth tergite. Long spines on ninth segment 174 m.

This species should also be placed in the group with *picipes* Zett., but is darker in color; third antennal segment is darker and oval impressions on sternites of male are ovate or spherical-ovate while in *picipes* these impressions are elongate and occupy more than one-third the width of the segment.

Described from five males and one female taken from *Solidago decumbens* and *Anaphalis subalpina* in August in Pingree Park, Colorado, by Professor C. P. Gillette.

All types in author's collection. (No. 1038a).

Taeniothrips pearsalli n. sp. (Figs. 4 and 5.)

Male holotype, color: Brown with yellowish orange pigmentation. Third and fourth antennal segments lighter, three lighter than four, six to eight concolorous with one and two. Fore tibiae yellowish, shaded dark brown on upper and lower margins; all tarsi lighter. Wings brown from base including scales, to tip, with longitudinal veins of fore wings clearly darker in color.

Head about one and one-half times as wide as long; front of head between eyes almost straight and cheeks only very slightly arched; back of head faintly cross-striate. The interocellar spines arise on the inner side just above and not between the posterior ocelli; all spines on head weak and inconspicuous. Eyes large, sub-triangular in shape, but neither prominent nor protruding; ocelli large, posterior ones almost contiguous with lower inner angles of eyes. Mouth cone short, triangular; maxillary palpi small with three segments (6-6-9 microns). Antenna about two and one-half times as long as head but nevertheless short and stumpy, segment five very small, semi-vase-shaped and about one-third longer than greatest width at apex.

Prothorax with posterior angles broadly rounded, the two prominent spines transparent, short (30 m.), the two pair of

spines inward from these along posterior margin small and inconspicuous. Legs normal. Wings fully developed with setae on fore longitudinal veins of anterior pair as follows: right wing, 1-3, 3-8-1; left wing, 1-3, 11 evenly placed; posterior vein, right wing, 2-4, left wing 1-8.

Abdomen with impressions on sternites 3-7 elongate ovate and small (15 x 45 m. on segment three), without comb on posterior margin of eighth tergite. Segment nine abruptly smaller than eight, long spines on segments nine (90 m.) and ten (84 m.). Segment ten with a dorsal suture for about two-thirds its length.

Female allotype: similar to male in color and general appearance. Slightly larger than male. Total body length 1.3 mm.; head length .096 mm., width .14 mm.; prothorax length .135 mm., width .18 mm.; antennae length: segment I, 12; II, 30; III, 39; IV, 36; V, 30; VI, 42; VII, 9; VIII, 8; total length 216 m.

Abdominal segments eight to ten together triangular in shape, with eight and nine narrowed abruptly and ten drawn out into a sharp point. Comb along posterior margin of segment eight sparse with only about twelve spines; segment ten with a dorsal suture over its entire length.

Described from one male and one female specimen collected by Mr. A. L. Pearsall, after whom the species is named, on aster (*Arnica cordifolia*) at Stillwater, Colorado, at an elevation of 8400 feet.

All types in author's collection. (No. 986.)

Thrips nigropilosus f. *pilosissimus* Pr.

This species was collected from Chrysanthemums in November at the Agricultural Experiment Station, Fort Collins, Colorado, by Dr. C. P. Gillette, and included both the long and short winged forms.

I am indebted to Dr. H. Priesner for the identification of these specimens and his comments as follows: "Very interesting, identical with *T. nigropilosus* f. *pilosissimus* Pr. Austria; *pilosissimus* may perhaps be still another species which I must doubt, based on abundant material already known from Austria. It is possible they are the transition forms between *nigropilosus* and *pilosissimus*."

This is the first record of this thrips being found in North America. (No. 529.)

Thrips brevopilosa n. sp.

Female holotype, color: Brownish yellow with crescents of ocelli and extreme tip of abdomen orange-yellow. All legs concolorous with body. Antennae: segment one light yellow to transparent; two light brown to brown; three grayish yellow in basal half, shading darker in distal half; four and five grayish yellow in basal one-third, shading darker in distal portions; six and seven dark grayish brown. Wings transparent, yellowish along veins; all spines light yellow to transparent. Total body length 1.38 mm. (paratypes varying 1.25–1.42 mm.); head length .12 mm., width .15 mm.; prothorax length .15 mm., width .20 mm.; pterothorax width .26 mm. Antenna length: segment I, 18 m.; II, 36; III, 54; IV, 45; V, 42; VI, 51; VII, 18; total 264 m.

Forward directed spines on anterior angles of prothorax small, 15 m.; on posterior angles, outer, 18 m., inner 30 m.; four on posterior margin on either side from the outside 15, 15 (15, 21) 21 m. Spines on ninth abdominal segment 75 m.; tenth 75 m. Spines on wing, costa 27; fore vein 4-3-1-2; hind vein 11 to 13. Fore longitudinal vein joins costa just before tip of wing; there are also two distinct cross veins joining costa and fore vein.

Male allotype: Color, as in female, spines on posterior angles of prothorax, outer 15 m.; inner 24 m. Wings as in female. Total body length .92 mm.

This thrips belongs to the group of light-colored species and may be separated from *winnemanae* Hood by the short transparent spines on the posterior angles of the prothorax (*winnemanae* H. has long, nearly black, angular bristles); from *quinciensis* Morgan by its larger size, deeper color, orange rather than red crescents of ocelli; from *nigropilosus* Uzel by its more elongate body, clear body and wing spines, different color of antennae; and from *hearaclei* Moulton, by the different coloration and lighter spines on angles of prothorax.

Described from twenty-four females and one male collected by Professor C. P. Gillette at Fort Collins, Colorado, from blossoms of alfalfa, *Cleome*, *Artemisia brittonii*, wild mustard, *Peritoma serrulatum*, and golden rod, June to October.

All types in author's collection. (Nos. 1036–1038.)

Bregmatotothrips iridis Watson

Two specimens of this thrips were collected from "Sour Cherry" at Urbana, Illinois, in May by Mr. P. A. Glenn. The

examples are almost identical with specimens furnished me by Mr. Watson as collected on Iris in England. Coloration and measurements are almost the same. The prominent spines on the anterior angles of the prothorax are 69 m. long as compared with 45 m. in the Watson material. This is the first record of finding this species in the United States.

Family PHLOEOTHIRIPIDAE Uzel

Phloeothrips (*Hoplandrothrips*) *orientalis* n. sp.

Male holotype, color: Light brown, body blotched with bright red pigment; fore tibiae light yellowish brown, especially in outer half, and shaded with deep brown along outer margin, fore tarsi light brown; eyes with clear yellow outer borders. Antennal segments one and two deep brown, one lighter in median basal part; three to eight brown with three, four and five lighter at base. Fore wings slightly brownish in the middle and almost transparent at either end.

Total body length 1.92 mm.; head length .32 mm., width .23 mm.; prothorax length .20 mm., width .36 mm.; tube length .166 mm.; fore femora .33 mm. long, .13 mm. wide; middle femora .18 mm. long, .066 mm. wide; hind femora .25 mm. long, .066 mm. wide. Antennae length (width): segment I, 45 m. (39); II, 54-60 (36); III, 96 (45); IV, 84-87 (42); V, 69-72 (36); VI, 60-66 (30); VII, 57 (24); VIII, 36 (15); total length 525 m.

Apex of head sub-conical, produced in front between basal segments of antennae; cheeks abruptly wider behind the eyes, sides almost parallel with a slight neck-like constriction near posterior margin. Postocular spines long, 120 m., with club-shaped tips. Small cheek spines on warts directed forward, those just anterior to neck constriction stouter than the others (21 m.). Eyes with small facets. Ocelli comparatively large, posterior ones opposite and almost contiguous with middle inner margins of eyes. Mouth cone sub-triangular, broad at base, rather sharply narrowed in the middle and drawn out into a pointed tip which reaches the base of mesosternum. Antenna 1.6 times as long as head, segment two clearly constricted neck-like in basal third, three clavate, four and five roundly clavate; sense cones short, stout, three on segment three, four on segment four, two on five, two on six, and one on seven.

Prothorax almost .7 as long as head and one and one-half times as wide as long. Sides strongly arched almost angular with a deep constriction before the base which

causes the posterior angle to stand out prominently. Three pair of long spines with swollen tips on either side, those on anterior angles 135 m., mid-laterals 120 m., on posterior angles 90 m., with still another pair on lower angles of prominent coxae 60 m. Pterothorax broadest with sides of metathorax converging gradually to the smaller abdomen. Fore femora greatly enlarged and bearing two small but distinct teeth on the inside near outer end; fore tibiae with a small tooth at base which fits between those on the femora; tarsal tooth large, projecting at a right angle; middle and hind legs slender, middle and hind tarsi each with a small sickle-shaped claw. Wings fully developed, very slightly narrowed in the middle, anterior pair with 11-13 double fringe hairs.

Abdominal segments two to eight gradually reduced; tube comparatively small, posterior angles of segments two to eight each with two long spines having swollen tips, wing-confining spines on segments two to seven, long curved, and pointed. A dorsal pair of long blunt spines on posterior margin of segment nine, posterior angles each with a short stout brown spine (60 m.) and a second long transparent pointed one (150 m.).

Described from one specimen which I have had in my collection for many years and which was taken from a plant in quarantine at San Francisco on a ship arriving from China in October, 1909. The Chinese steward called the host plant "Quasses" and I was unable to get further information except that the plant had been taken aboard the ship at Hongkong, China.

Dr. Priesner, who kindly examined the specimen, comments upon it as follows: "near *russelli* but having fewer double fringe hairs; near *ellisi* Bagnall but posterior head thorns clearer."

Holotype in author's collection. (No. 224.)

Liothrips vaneeckei Priesner.

I obtained many specimens of this thrips which were found on lily bulbs (*Lilium carolinianum*) from North Carolina and intercepted in Portland, Oregon, by Mr. C. Parthington. (No. 624.)

Liothrips montanus Hood.

Specimens taken from Red Currant at Ottawa, Canada, in June by Mr. T. Rankin. This species has heretofore been recorded from currants and gooseberries from Bozeman, Montana. (No. 1012.)

Liothrips brevitubus Karny.

Dr. Karny records this species as found in the leaf galls of *Mallotus repandus* and *Mallotus philepinensis* from Java. I am

now extending its distribution to Dehra Dun, India, where it has been taken also on *Mallotus philepinensis* in February, by Mr. M. Bose. (No. 635.)

Rhynchothrips ampelopsidis n. sp.

Female holotype, color: Blackish brown except all tarsi and tips of fore tibiae which are brown, and all antennal segments which are as follows: one dark brown, two dark brown at base and along inner margin, lighter in middle and toward tip, three yellowish brown, four, five and six shading gradually darker; seven and eight brown.

Total body length 1.66 mm.; head length .18 mm., width .20 mm.; prothorax length .21 mm., width .33 mm.; tube length .165 mm. Antennae length: segment I, 27 m.; II, 51; III, 60; IV, 63; V, 60; VI, 54; VII, 48; VIII, 36; total length 390 m.

This species is very close to *R. ilex* Moulton, 1907, but the prothorax is longer in relation to the head, and all tarsi and third antennal segment are brown as compared with yellowish in *ilex*. Postocular and thoracic bristles pointed. Wings fully developed but short, reaching to seventh abdominal segment in holotype, but absent in all other specimens before me. Fore tibiae and tarsi unarmed.

The larvae have a deep red color while the larvae of *ilex* are orange yellow, with a little red in the prothorax and in the seventh and eighth abdominal segments.

Dr. C. P. Gillette collected this species from Virginia Creeper (*Ampelopsis quinquefolia*) in June, at Fort Collins, Colorado.

Described from ten female specimens.

All types in author's collection. (No. 1026.)

Haplothrips shackelfordi n. sp.

Female holotype, color: Dark brown, red pigmentation not conspicuous; fore tibiae brown in basal third shading to clear yellow in distal third, slightly darker along outer margin. All tarsi yellow. Antennal segments one and two dark brown, two lighter toward tip; three to six clear yellow; seven yellow and shaded light grayish brown; eight only a little darker than seven.

Total body length female paratype: Distended 1.9 mm.; head length .20 mm., width .16 mm.; prothorax length .16 mm., width .22 mm.; pterothorax width .25 mm.; tube length .105 mm. Antennae length (width): segment I, 21 (27) m.;

II, 45 (27); III, 45 (24); IV, 51 (30); V, 45 (27); VI, 42 (26); VII, 33 (20); VIII, 24; total length 300 microns. Length of dorsal spines on ninth tergite of female holotype and male allotype:

	<i>Female holotype</i>	<i>Male allotype</i>
Middle spines	81-90 m.	60-90 m.
Inner angular spines	105-120 m.	39-45 m. stout
Outer angular spines	100-105 m.	111-120 m.

This species is most closely related to *aculeatus* Fabr. but the head is more elongate and the middle and hind tarsi clearer yellow, while the postocular spines are 30 m. long as compared with 45 m. or longer in *aculeatus*.

The postocular and prothoracic spines are pointed, the seventh and eighth antennal segments are almost yellow and middle and hind tarsi yellow in *shacklefordi*, while in *gowdeyi* Franklin, the terminal antennal segments are deep brown and the postocular and prothoracic spines have dilated tips.

Described from four males and two females. Specimens collected by M. W. Shackleford in the prairie area, Champaign County, Ill.

All types in author's collection. (No. 1654.)

Haplothrips (phyllophilus) subtilissimus Hal. f. *floricola* Pr.

Taken from under bark of *Sciodyptis verticillata* in San Francisco quarantine aboard ship from Japan, January, 1912. Identified by Dr. Priesner. (No. 544.)

Haplothrips subtilissimus Hal.

Taken from pear buds at North East, Penn., by Fred Johnson in May, 1911. Identified by Dr. Priesner. (No. 545.) This species was also taken from heather aster at Newark, N. J., by Wm. Trager in October, 1926. (No. 1371.)

Leptolothrips n. gen.

Head almost one-third longer than wide, width of head about equal to length of prothorax. Vertex of head swollen, arising over basal segments of antennae as in *Leptothrips* and bearing the anterior ocellus. Mouth cone long, reaching well past posterior margin of prosternum and sharply pointed as in *Liothrips*. Fore femora greatly enlarged in male, about as long as head and half as wide as long. Tube two-thirds as long as head. Middle and hind legs long and slender, fore tarsi each with a distinct tooth. Wings with parallel sides but not as broad as in *Liothrips*, and not narrowed in the middle as in *Leptothrips*.

This interesting thrips cannot be placed in any of our present known genera. It has the appearance of a *Leptothrips* in the swollen vertex of the head, prominent and rising above the base of the antennae, and in the shape of the antennae, but it departs clearly in the long and sharply pointed mouth cone and in having wings with almost parallel sides and not reduced in the middle. It resembles the genus *Liothrips* in these particulars. It departs from *Liothrips* in the greatly enlarged fore femora (in the male).

Type: *Leptolothrips manilae* n. sp.

Leptolothrips manilae n. sp.

Male holotype, color: Uniform deep brown, fore tibiae lighter, shaded dark brown on upper and lower margins, fore tibiae yellowish brown to light brown. Antennal segments one and two concolorous with head, two lighter near tip; two, three and four light yellowish brown, each segment shaded a little in outer half; six to eight brown, six a little lighter near base.

Measurements: Total body length (in normal condition) 1.50 mm.; head length .25 mm., width .18 mm.; prothorax length .16 mm., width (including prominent coxae) .33 mm.; tube length .165 mm., width .060 mm.; fore femora length .255 mm., width .126 mm. Antennae length: segment II, 45 m.; III, 78; IV, 78; V, 69; VI, 54; VII, 48; VIII, 24; total length 396 microns.

Head elongate with cheeks evenly and slightly arched from margin of eyes to posterior angles; entire dorsal surface faintly but distinctly transversely striate. Vertex swollen and produced over the basal joints of antennae. Postocular spines long (63 m.) with dilated tips. Eyes large, with small facets, not protruding. Fore ocellus large, placed at tip of swollen vertex, directed forward. Posterior ocelli contiguous with inner anterior margins of eyes. Ventral side of head continued back to almost one-third the length of the prothorax where the base of the mouth cone arises. Mouth cone long and sharply pointed reaching well past the prosternum. Antennae about one-third longer than head, segments three and four subequal and longest, five, six and seven gradually becoming shorter, with two and seven of about equal length, seven and eight closely united.

Prothorax trapezoidal in shape, with sides almost straight diverging evenly to near posterior margin where the broadly rounded fore coxae form the prominent posterior angles. Metathorax only slightly wider than prothorax including

fore coxae. Legs long and slender, fore femora greatly enlarged, fore tibiae unarmed, each fore tarsus with a distinct tooth.

Wings well developed reaching to base of tube, with parallel sides, without veins or coloring, eight to eleven double fringe hairs. Tube two-thirds as long as head, narrowed evenly over distal half.

I am indebted to Mr. George Compare, who collected these specimens in 1909 while traveling and collecting in Manila, Philippine Islands. Host plant unknown.

Described from three male specimens. All types in author's collection. (No. 233.)

Gynaikothrips orchidis n. sp.

Female holotype, color: Quite uniformly dark brown except fore tibiae which are yellowish at extreme base and in outer two-fifths, middle and hind tibiae yellowish at extreme tips, all tarsi yellow. Antennae: segments one and two dark brown, three and four yellow, slightly smoky in outer third, five yellow, light grayish brown in distal third, six yellow at base, grayish brown in distal two-thirds, seven and eight brown. Wings light brown shaded distinctly darker along anterior and posterior margins and with a dark median line fading out in distal portion of wing, abruptly and distinctly whiter back of median dark line giving the effect of a broad white longitudinal line between median and posterior darker lines. Posterior wings transparent with a broad shaded line along posterior margins. Measurements: Total body length (in normal condition) 2.66 mm.; head length .35 mm., width .25 mm.; prothorax length .22 mm., width including prominent coxae, .40 mm.; pterothorax width .48 mm.; tube length .28 m. Antennae length (width): segment I, 24 m.; II, 54 (36); III, 105 (36); IV, 108 (45); V, 105 (39); VI, 96 (36); VII, 75 (27) VIII, 36; total length 540 microns.

Head about one-third longer than greatest width, front of head produced between basal segments of antennae, frons slightly swollen and elevated and having anterior ocellus at tip but not overhanging base of first antennal segments. Cheeks slightly and broadly rounded, back of head constricted broadly neck-like. Eyes with rather small facets, not pilose, not protruding. Ocelli fully developed. Post-ocular spines, prominent, pointed, .66 m. long. Mouth cone sub-triangular, bluntly pointed, with a large light spot on

either side surrounding base of each maxillary palpus. Antennae one and one-half times as long as head, with segments three, four and five elongate, club-shaped, four longest, three and five subequal; sense cones as follows: segment three with one on outer side near tip, none on inner side, four with three large and one small, five with two long and one small, six with two long and one small cone, long sense spine on seven surpassing tip of eight. All large cones long and pointed.

Prothorax, including prominent coxae, one and three-quarters times as wide as long with sides evenly diverging from anterior margin to rounded angles formed by prominent coxae, then sharply constricted to the mesothorax. Anterior angular spines short and directed forwards (30 m. long); anterior marginal spines 60 m. long; mid-laterals 100 m., posterior angle spines longest 150 m., posterior marginal spines 135 m.; all spines pointed. All legs long and slender; fore tibiae and tarsi unarmed. Wings fully developed with fourteen double fringe hairs. All prominent spines on abdomen long and pointed. Tube four-fifths as long as head.

I am again indebted to Mr. Compare, who collected this specimen from orchids in Manila, Philippine Islands, March 3, 1912. Described from one female specimen.

Holotype in author's collection (No. 546).

EXPLANATION OF PL. XI.

- Fig. 1. *Kurtomathrips morrilli* female. '
- Fig. 2. *Taeniothrips tahoei* male. Tip of abdomen.
- Fig. 3. *Taeniothrips pingreei* male. Tip of abdomen.
- Fig. 4. *Taeniothrips pearsalli* male. Tip of abdomen.
- Fig. 5. *Taeniothrips pearsalli* female. Tip of abdomen.